



## A learning-based approach to preventing dental phobias

LT Keith D. Eiche, MSC, USNR, and LT Jeffrey H. Cook, MSC, USNR

### Introduction

Several studies have demonstrated that early painful experiences predispose to dental fears and avoidance in adults. This dental avoidance can be characterized by high numbers of cancelled appointments, severe anxiety, heightened reactivity to pain, and a failure to schedule appointments (1,2). This review will cover the general phenomena of dental phobias, including the etiology, and the impact of this condition on the patient's dental health. Additionally a simple and easily implemented procedure for prevention of dental anxiety and phobia will be presented.

### Dental phobias

Dental phobias are defined by the American Psychiatric Association's Diagnostic and Statistical Manual, 4th edition (DSM-IV) as an instance of a Specific Phobia, characterized by "A marked and persistent fear that is excessive or unreasonable, cued by the presence or anticipation of a specific object or situation" (3). People with dental phobias will display a strong fear response when anticipating or experiencing specific dental procedures, or even the general dental office environment. The fear response is characterized by subjective anxiety, increased heart rate, palpitations, hyperventilation/rapid breathing, sweating, chills, dizziness, nausea, and an urge to escape the situation. Based on a review of the dental phobia literature, Weinstein noted that dental phobias and dental anxiety constitute a major public health problem (4). Efforts to address this major public health issue must begin with an accurate understanding of the factors that contribute to the etiology and maintenance of this condition.

### Etiology

Perhaps the predominant theory regarding the development of dental phobias is based on classical conditioning and learning theory. This theoretical position and the specific conditioning principles are empirically well validated by decades of experimental evidence (5). Based on this position, phobias such as dental phobia are acquired via a process where a neutral situation or stimulus is paired with an aversive stimulus. Examples of neutral stimuli in a dental office might be the sight and sound of the drill, the dental chair, and even the treatment room as a whole. The most common aversive stimuli in dental situations are pain and anxiety attacks (1). After even one such pairing, further contact with such neutral stimuli will evoke marked fear responses. Three main factors mediate whether conditioning occurs, first, the intensity of the aversive stimuli (a little vs. severe pain), and second, the amount of prior exposure to the neutral stimuli without the aversive stimuli. This phenomenon is called "latent inhibition" and can be a protective factor against dental phobia. Greater pain and less prior exposure increase the probability of acquiring a fear, and conversely, low pain levels and more prior exposure decrease

the probability of fear acquisition. Third, the patient's subjective appraisal of the situation can also either attenuate or exaggerate a negative experience.

### Maintenance

Individuals with learned fears such as dental phobias often come to avoid the situations they fear, or at best endure high anxiety during such a situation. Such avoidance is functional, in that it is rewarded with the absence of very high anxiety, a process known as negative reinforcement (6). As a group dental phobics have a higher than average no-show and cancellation rate compared with non-phobics (2). This avoidance and subsequent reinforcement serve to maintain or perpetuate the phobic response. As a result of avoidance of regular dental visits, the dental phobic may have several adverse dental conditions, such as dental caries and periodontal disease. An additional consequence is that when they do come in for appointments, their anxiety makes their treatment more difficult for themselves and their providers.

### Definition: Latent inhibition

The term latent inhibition refers to a well-documented factor involved in learning new associations, wherein prior exposure to a stimuli results in a decreased ability to acquire new associations to that stimulus (7,8). Latent inhibition is formed when an organism is repeatedly presented with a neutral stimulus that is not followed by another stimulus. For example, if one wanted to form an association between a tone and a shock, (e.g., fear conditioning), one would simply play the tone consistently before a shock occurs. However, if the tone has been presented several times without the shock following it, the animal will basically learn that the tone does not signal shock, and will tend to disregard it in the future. Many researchers have suggested the application of latent inhibition for fear and phobia prevention (9,10).

Several studies have provided indirect evidence for latent inhibition in the acquisition of dental phobias. Compared to non-phobics, dental phobics tend to have had early painful experiences with very little prior exposure to non-painful experiences before the first painful visit (1,11). The findings are very consistent with latent inhibition playing a preventative role in fear acquisition. While these indirect findings strongly suggest that latent inhibition would be a pivotal factor in preventing fear acquisition, there have not been any published reports of latent inhibition as a primary prevention method for dental phobias. Research in this area should hold great promise.

### Proposed intervention

The principle of latent inhibition suggests that the learning based acquisition of dental phobias may be prevented via gaining non-painful prior exposure to dental stimuli. The following is a suggested intervention plan for fostering latent inhibition

that could be implemented in a dental treatment setting. It is important to note that the most likely target group for this intervention is children and pre-teens that are at the point of first receiving dental care. For adolescents and adults, it is unlikely that they would not have had prior contact with dental providers, therefore limiting the applicability of this approach. Patients whom already have a dental phobia should receive a different intervention, as this is a preventative measure.

The key facet to this intervention is pre-treatment visits, which will serve an inoculation-like function. The visits should ideally simulate a regular dental visit, in order to maximally develop the inoculation effects of latent inhibition. Besides decreasing the novelty of the dental environment, these visits will serve to lower the patient's anxiety levels. These visits should incorporate as many of the following parameters as practical.

First, it is important to use the same room, or a highly similar one, where the actual treatment procedures will occur. Second, treatment personnel may differ from visit to visit, several facets of the persons clothing and equipment should remain constant. For example a surgical mask, gloves and cap should be worn in inoculation visits as they are in standard office visits. It may be impractical at most facilities to have a dentist perform these procedures, however, dental assistants, hygienists, dental technicians, and other paraprofessionals could perform this task. Another essential parameter is the simulation of procedures without pain. This should include having the patient sit in the examination chair and having staff examine the teeth - touching with gloved fingers and instruments that will not produce pain with touch. Other important details are wearing a drape during the visit; experiencing rinsing, the sound and feel of the suction and rinsing instruments, listening to the sound of the drill, and having the examination light on.

While no empirical studies have determined the optimal number of inoculation visits, we recommend 2-5 such visits, lasting approximately 20 minutes each. Multiple visits will build a resistance to forming fear associations to dental stimuli. It is unlikely that one visit would foster this resistance to a clinically significant degree.

One last intervention that we recommend, if practical, based on resources is the use of a videotaped inoculation session. This video would serve to further expose the patient to dental stimuli, and take advantage of the well-documented effects of anxiety reduction that occur simply from watching a non-fearful person engaged in an activity. A suggested format for the tape would be following a typical patient through an office visit.

### Conclusion/Summary

At all levels, from simple dental fears to severe phobias, dental anxiety presents a problem for the dental practitioner. These individuals present special challenges to the dental staff in terms of managing their care. The subjective experience of patients is a priority for dental providers who often feel frustrated when they are unable to alleviate the fear and suffering of their patients. Dental anxiety in patients can make the treatment experience unpleasant for both patients and dentists. Therefore, prevention of dental anxiety will likely increase patient satisfaction and decrease provider frustration in the provision of care. Moreover, prevention of dental phobias will logically result in fewer lost appointments due to avoidance, in addition to overall improved public health.

In reviewing the literature, there appears to be a dearth of studies examining learning principles in preventing dental phobias. While there are relatively few studies providing direct support for applying latent inhibition in dentistry, a significant body of research has validated the learning principles providing the framework for the present intervention. This is both a promising and clinically valuable area for future research.

Many providers may note that they already employ some elements of this proposed approach, and the use of some elements is certainly preferable to the use of none at all. However, the authors advocate the systematic application of the complete intervention program as proposed. Use of this approach provides a theoretically grounded procedure that in addition to being methodical and standardized, should optimize long-term dental phobia prevention.

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Lieutenant Eiche is a staff psychologist at the National Naval Medical Center, Bethesda, and Lieutenant Cook is a staff psychologist at the US Naval Hospital, Okinawa, Japan.

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